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PRELIMINARY STAFF REPORT

ON THE

STATUS OF THE DOMESTIC MINING INDUSTRIES

FOR USE AT

HEARINGS ON H. CON. RES. 177

BEFORE THE SUBCOMMITTEE ON MINES AND MINING OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, HOUSE OF REPRESENTATIVES

JUNE 25–JULY 2, 1959

FOR COMMITTEE USE ONLY

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MINING HEARINGS, HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, JUNE 25–JULY 2, 1959

PRELIMINARY STAFF REPORT ON STATUS OF THE MINING INDUSTRIES

FOREWORD

This report has been compiled by a staff consultant for the information of members of the Subcommittee on Mines and Mining in advance of the hearings. It embodies easily assembled statistics and factual information which may be useful in the evaluation of testimony by various witnesses and which may help in the framing of questions that will elicit additional information and expert opinion. Inasmuch as the author of this report has not recently visited the mines or talked with persons actually engaged with the various mining industries discussed in this report, the data as well as some of the policy statements and conclusions contained herein are subject to revision when and as opportunity affords.

INTRODUCTION

In the innumerable attempts that have been made to implement a national minerals policy, agreement seems to have been reached that a healthy and strong mining and minerals industry is requisite to American security in peace or war. Ours is more and more a mineral-based economy. Most thinking persons realize that certain branches of the domestic mining industry need help. Even though we require imports of mine products in order to meet the ever-growing requirements of an expanding economy, it is vitally necessary to maintain a vigorous mobilization base which can be expanded quickly whenever emergencies arise.

On the other hand, broad areas of disagreement exist as to how far we should go in the present situation in efforts to nourish the mining industries and to keep alive segments which may be heavily handicapped in competition with foreign supply. Moreover, it is necessary to keep in mind possible conflicts between policies aimed at aiding domestic minerals and other national policies and aspirations.

How far should we go in bolstering our domestic industry in the face of protests from friendly nations that want to sell their minerals products in the big U.S. market? Can we raise the price level of mineral raw materials to domestic manufacturers without unduly handicapping them in disposing of their products? Should we build a fence around our mineral reserves in order to conserve them for posterity, in order not to exhaust our reserves ahead of those of other nations? Can American dollars and manpower be used more efficiently in producing other goods and services rather than in extracting minerals from some of our relatively low-grade deposits?

The foregoing are only a few of the many questions that have to be considered. Some of them are difficult to answer. It is recognized that the overriding principal of diminishing returns must temper our judgment in each area of conflicting interest. It does not follow, however, that we should continue to rely solely upon stopgap palliatives to meet each new crisis when it arises.

The problems involved in carrying out a national mineral policy are only too apparent. Tariffs, quotas, subsidies, incentive price-purchase programs, depletion allowances, accelerated amortization and other tax concessions, technical assistance, and other devices have all been tried, but no set of ground rules has yet been established to afford needed guidance as to when and how suitable remedies should be applied.

The immediate purpose of the committee is to assay the status of the domestic mining industries. We have to know which segments are presently strong and which are weak or dying. We must also study the impact of closing mines, shrinking payrolls, and reduced tax revenues on local communities. In industries and in mining districts which are depressed we want to ferret out the causes which led to this condition.

The limited objective of the present hearings, therefore, is to bring out the basic facts regarding the ability of the American mining industry to supply the metals, industrial minerals and solid fuels needed to meet the demands of an expanding economy in peace or war. Only when these facts are known and not until we know more about their causes and effects, can we wisely undertake the recommendation of suitable remedies and the shaping of domestic policies that will serve as guid lines for a long-range program.

I. Size and Importance of the Mineral Industries of the United States

Tables 1 and 2 show the value of U.S. mineral production distributed by mineral groups and by States, respectively, in specified years. Table 3 gives trends in physical volume and table 4 shows the amounts of national income generated by the mining industries.

As shown in table 1, the value of domestic mineral production rose to an alltime record of $18,126 million in 1957. Excluding oil and gas valued at $9,976 million from this grand total, the value of the domestic mine products considered in the present investigation was $8,150 million.

Compared with the gross national product, $440,328 million in the same year, the foregoing figures are not particularly impressive. In respect to number of workers directly employed, the mining industries are even less significant. As shown in table 5, the grand total for these industries averages only 811,100 persons of whom 326,200 were in the oil and gas industries, leaving a total of only 484,900 workers actually employed in the extraction of metals, industrial minerals, and solid fuels. These figures compare with a total labor force of over 70 million.

Mining is a sizable industry. In terms of national income generated it ranks ahead of any of the various groups of manufacturing industries except food, chemicals, and metal products. The mining group is also ahead of communications, trucking, banking, and most service industries. However, as the figures in the preceding paragraphs show,

it is not a dominant source of national income or employment. There is some significance to the fact that most mine products, other than fuels, are durable increments to our national wealth. However, it does not follow that they are superior to other raw materials merely because they last a long time. Once produced, they do not go up in smoke or disappear down the throats of people and animals.

The great national importance of minerals arises from the fact that they provide the sinews of war and literally the foundation and framework of our industrial structure. Notwithstanding better efficiency in their use and improved conservation practices our mineral requirements expand faster than our economy as a whole. Minerals are the source of job opportunities in other industries. Only by guaranteeing the continuing supply of mine products can we hope for full employment of the Nation's workers or for providing the weapons and equipment needed for national defense. It has been estimated that minerals alone, by reason of the work performed in getting them out of the ground and in transporting and processing them for ultimate consumption, furnish about two-thirds of our national wealth. For example, the iron content of iron ore for which the miner gets only a few cents may be worth dollars a pound by the time it is converted into vital automotive equipment, airplane parts, electronic devices, or business machines.

In many of our Western States and to a varying degree in other States nonferrous metal mining is locally the predominant industry. In northern Minnesota and Michigan prosperity depends largely on iron mining activity. In an important area in Pennsylvania the plight of anthracite miners is the cause of serious dislocations, and in various Appalachian bituminous coal mining districts mine payrolls measure the economic well-being of the population.

II. Current Versus Historical Trends

General

The appended tables show that U.S. minerals production as a whole has registered consistent growth. The value and physical volume of production attained an alltime record total in 1957. Compared with the 1947–49 average, the physical volume (see table 3) of all minerals produced was 26 percent higher but this gain was strongly influenced by the 50 percent increase in crude oil and gas production and to a lesser extent by the 45 percent increase in industrial minerals (nonmetals other than fuels). The increase in metal mine production was only 19 percent and the coal mine output was nearly 18 percent less than it was during the 1947–49 base period. Meanwhile, during this same decade, the increase in total U.S. industrial production was about 43 percent.

In broader perspective, the rate of growth of our overall mineral production, as shown by contrasting the 1957 statistics with comparable figures for earlier years, outpaced that of agricultural production and far outstripped the large increase in population but failed to match the spectacular rise in industrial production. Since about 1940, especially, the domestic mine production of metals and solid fuels has lagged behind factory production. In 1958, as compared to 1947, metals lost ground due to lower prices and some reductions in volume. Nonmetals as a group held steady in volume and value. Solid fuels were off 20 percent in value; while fuel prices remained level, output

was down. Even in 1957 the value of nonfuel minerals was less than it was in the preceding year.

It is appropriate at this point to emphasize the fact that conditions in different branches of the mining industry differ widely. Some continue to ride the crest of the economic wave while others seemed destined to stay in the trough. On the other hand, there are certain apparent trends and economic influences which affect all branches to a greater or lesser degree. Some of these trends and influences are discussed below.

Employment

Table 5 shows the general decline in mining employment and the changes in various branches of mining for specified years. From 1939 to 1957 the overall drop was 18.6 percent. Employment decreases of 71 percent in anthracite mines, 44.3 percent in bituminous coal mines, and almost 10 percent in metal mines were only partly offset by the 35 percent increase in employment in oil and gas wells and a 30 percent gain in the number of workers engaged in nonmetallic mining.

Wages

Since wages and salaries represent from 40 to 60 percent or more of the cost of producing most mine products, increases in wage rates are important to the mineowner even though in the long run they may be offset by increased efficiency or by inflation-produced higher prices for the products.

Table 6 shows changes in hourly earnings in each of the major branches of the industry. In 1958, average gross earnings of mineworkers per hour were 3½ to 4 times the prewar 1939 rates. So-called fringe benefits or changes in employers' liability insurance rates, and other expenses piled on top of these increases in nominal wages have further enhanced the cost to the employer of an hour's work, in mining perhaps more than in most industries.

Consumption

Although the apparent consumption of many metals and minerals in the United States in 1957 and 1958, and of a few commodities in 1956, fell short of previous record quantities, the mineral requirements of the United States are definitely increasing. Consumption in other free world countries is increasing even faster. Intercommodity competition is an ever-present hazard in the marketing of mine products as well as of manufactured goods. The near-collapse of the anthracite industry and the recurring problems of bituminous coal miners result from competition from liquid and gaseous fuels. The displacement of white lead by titanium pigments and the growing use of aluminum for some uses formerly dominated by copper or other metals are familiar additional examples of interindustry competition. However, total energy requirements continue to rise rapidly, and our appetite for metals and other mineral raw materials continues to grow.

The reserve situation

While it is true that most of our bonanza deposits are gone and that domestic mining companies are generally working lower grade deposits than many of their foreign competitors, the American position as regards reserves of most major mineral products is still good. Intensive working of the deposits in recent years, instead of exhausting

our national resources, has encouraged active prospecting and exploration with the result that our known reserves have generally increased. In the cases of several of the strategic metals the increase of known domestic resources has been spectacular, and throughout the list of mineral commodities new discoveries have tended at least to keep pace with mining output.

In a recent paper (Mining Engineering, February 1959, pp. 155–156), C. W. Merrill, of the Bureau of Mines, analyzed the price records of seven representative mineral commodities for the 68-year period through 1957. These records show a substantial overall fall in real prices in terms of dollars of constant purchasing power. Inasmuch as this downtrend has occurred during a period of almost fantastic increases in demand for mineral products, it contradicts the widely held concept that heavy drafts on a mineral resource inevitably lead to scarcity and rising prices.

Prices versus costs

The U.S. Bureau of Labor Statistics indexes (see table 8), indicate that average prices of iron ore and of nonferrous metals as a group increased faster and currently are considerably higher than the average wholesale price of all commodities. Even coal prices are somewhat higher than this general yardstick.

Prices of explosives and construction machinery and equipment, which are important items in mining cost, have outpaced those of mine products—and wages, as indicated previously, have gone up much faster. However, the total index of mine expenses which allegedly—

> gages the impact of labor cost and productivity, but does not include capital cost and contract work, has not paced the increases in prices of nonferrous metals.

This overall picture calls for further study and, of course, some mine products, notably lead and zinc, have fared much worse than others.

Imports

Before and for some time after World War I the United States was the leading exporter of copper, zinc, petroleum, and various other mineral commodities which now we import. In many cases this change from an export to an import basis merely means that consumption has expanded faster than domestic production. In other cases, however, the expansion of imports of minerals products has injured the domestic industries.

Table 9 shows some of the changes which have recently occurred in the ratio of imports to total new supplies of various commodities.

Self-sufficiency

Table 10 brings out the fact that U.S. self-sufficiency in many important metals and minerals has drastically declined. Table 11, showing U.S. production as a percentage of world output of specified minerals, is also of interest in this connection. In a few cases where domestic mine production represents a larger percentage of domestic consumption in 1957 versus 1950 it may be noted that consumption declined as in the case of copper or that domestic production was

being stimulated by Government purchase programs as in the case of mercury and chromite.

A chart prepared by the Bureau of Mines in January 1953 shows that even in 1952, the United States was self-sufficient in its supplies of only three metals, namely magnesium (from seawater), tellurium (a smelter byproduct), and molybdenum.

III. Distressed Areas in the Mining Industries

A. Individual industries in special jeopardy

By far the most important distressed segment of the mining industries, as regards size and number of establishments and numbers of persons affected, is the lead and zinc industry. Most of the other industries which are especially distressed at the present time are concerned with the production of strategic materials which have been stimulated by Government assistance programs of one sort or another but which are now abandoned to free competition. This list includes antimony, low-iron asbestos, cobalt, columbium-tantalum, fluorspar, and tungsten.

The anthracite industry is caught between a declining market and increasing costs. While many bituminous coal mining districts are active and more or less prosperous, in many formerly prosperous communities, particularly where the mines are small or are situated some distance from rail transportation, employment has dwindled.

B. Depressed mining districts

Since the days of the 49'ers, mushroom mining camps have sprung up and declined, leaving ghost towns in their wake. In the early days, however, the miners could usually find employment in a not too distant camp and the physical assets represented by the abandoned mine plant and commercial facilities tended to be rather small. Today, however, the mining industry is no longer characteristically isolated in sparsely populated areas. Even the Western States where mining is still a dominant industry, the communities have grown to substantial size and have taken on a permanent character. Under these circumstances the communities affected cannot be abandoned when the mines close. The inhabitants remain in their homes even after employment opportunities cease to exist.

The tristate region of Kansas, Oklahoma, and Missouri is one of the worst sore spots at present. Until a relatively few years ago this area was the principal domestic source of lead and zinc, and other activities in the region were largely dependent upon mining. The situation in this region has been investigated by a special subcommittee of the Committee on Interior and Insular Affairs headed by Representative Ed Edmondson of Oklahoma. A copy of the report of this subcommittee is appended to this report as appendix B.

Another important and widespread area of depression is the anthracite region in the general vicinity of Wilkes-Barre, Pa. Bituminous coal mine communities which have suffered severely from changing conditions are mostly situated in Kentucky, West Virginia, and southwest Virginia.

The impact of retrenchment in the metal mining industry has been felt most seriously in the Western States, especially Nevada.

IV. General Effects of Mine Shutdowns and Reduced Employment

A. National

Loss of mineral reserves in flooded and caved workings; deterioration of average grade of ore due to overselective mining; cutbacks of exploration and development; halting of discovery of new deposits and of technologic progress.

B. Local

Ghost towns and blighted communities, exhausted unemployment benefits and relief funds, "creeping paralysis" affecting retail trades, transportation, and related industries, increased tax burdens and reduced real property valuations for tax purposes, permanent dispersal of managerial and engineering staffs familiar with local conditions, migration of younger workers, deterioration of human resources, and loss of skills of older workers because of disuse.

V. Causes of Depressed Conditions in Mining Industries

A. Symptomatic

Price declines, rising costs, increasing imports, "overproduction," decreased employment opportunities, miners seeking jobs in other industries.

B. Natural and general economic handicaps

Wage advances, deterioration of remaining reserves, exhaustion of major deposits, substitution or shrinking markets, local tax levies, transportation costs, discovery of new and richer deposits.

C. U.S. Government actions

Stockpile purchases, barter transactions, stopgap supports; expansion goals set too high (or too soon), artificial stimulation of foreign production by financial grants, loans, purchase contracts, technical assistance; antitrust laws, tariff reductions.

Table 1.—*Value of U.S. mineral production, by mineral groups*

[In millions of dollars]

Year	All minerals	Metals	Nonmetals	Coal	Oil and gas
1939	3,808	631	754	916	1,507
1945	6,231	774	888	2,092	2,477
1950	11,862	1,351	1,822	2,893	5,796
1951	13,529	1,671	2,079	3,032	6,747
1952	13,306	1,617	2,163	2,669	6,947
1953	14,418	1,811	2,350	2,547	7,710
1954	14,067	1,518	2,630	2,017	7,902
1955	15,807	2,055	2,972	2,298	8,482
1956	17,383	2,358	3,284	2,649	9,092
1957	18,126	2,129	3,277	2,736	9,984
1958					

Source: Minerals Yearbook.

TABLE 2.—*Value of U.S. mineral production, by States*

[In millions of dollars]

State	1950	1955	1957	1958 [1]
Alabama	159.0	186.5	209.4	162.9
Alaska	17.9	25.4	28.8	22.3
Arizona	207.4	378.3	372.6	318.1
Arkansas	119.6	132.8	140.9	131.5
California	1,056.4	1,456.5	1,650.9	1,451.0
Colorado	154.9	286.2	340.6	300.8
Connecticut	5.7	10.4	16.1	12.2
Delaware	.5	1.7	1.0	1.3
District of Columbia				
Florida	70.7	109.0	136.0	138.7
Georgia	43.4	60.4	69.8	72.5
Hawaii	1.8	3.6	5.9	5.9
Idaho	79.3	68.5	73.5	62.8
Illinois	488.1	533.1	579.6	571.0
Indiana	166.6	183.5	198.9	196.4
Iowa	41.8	63.6	69.0	79.5
Kansas	368.6	470.8	505.1	502.2
Kentucky	460.0	391.1	450.4	429.0
Louisiana	693.6	1,156.6	1,524.9	1,459.0
Maine	7.5	13.0	12.7	12.8
Maryland	22.7	35.5	39.6	43.2
Massachusetts	16.1	22.1	24.8	22.1
Michigan	230.2	363.8	404.4	341.1
Minnesota	331.6	501.2	584.5	376.0
Mississippi	102.9	122.6	149.3	144.6
Missouri	113.2	151.6	152.9	141.5
Montana	103.6	167.0	191.7	177.3
Nebraska	14.0	54.2	83.3	89.5
Nevada	48.5	113.2	86.0	66.9
New Hampshire	1.7	2.6	3.3	2.8
New Jersey	46.8	57.5	64.9	47.8
New Mexico	210.3	436.5	553.0	557.1
New York	156.6	216.9	244.3	202.1
North Carolina	26.3	41.2	37.6	35.3
North Dakota	9.6	44.1	57.8	57.6
Ohio	274.6	340.5	385.9	323.3
Oklahoma	527.1	711.1	803.9	767.7
Oregon	21.5	31.7	42.5	42.1
Pennsylvania	1,186.2	969.9	1,082.1	887.2
Rhode Island	1.4	1.8	1.4	1.5
South Carolina	11.4	20.2	22.2	21.6
South Dakota	32.7	40.5	40.0	42.6
Tennessee	90.4	119.3	128.7	127.8
Texas	2,674.5	3,993.3	4,497.3	4,034.6
Utah	230.0	331.9	356.2	339.0
Vermont	18.6	23.9	21.9	21.0
Virginia	137.8	172.5	224.5	201.1
Washington	49.1	67.3	58.7	59.0
West Virginia	829.6	755.5	982.7	748.6
Wisconsin	41.7	65.8	68.6	61.8
Wyoming	177.7	297.8	345.6	376.5
Total	11,881.6	15,804.0	18,126.0	16,290.0

[1] Preliminary figures.

Source: Minerals Yearbook.

TABLE 3.—*Indexes of physical volume of U.S. mineral production*

[1947–49=100]

Year	All minerals	Metals	Nonmetals	Coal	Oil and gas	Total industrial production
1939	70.8	90.2	61.1	74.8	65.7	58
1945	92.0	95.2	70.2	103.7	97.3	107
1950	102.6	108.8	116.1	91.7	105.1	112
1951	112.6	117.2	127.3	93.6	119.9	120
1952	110.9	112.7	132.1	82.7	122.8	124
1953	112.6	119.1	135.2	78.8	126.6	134
1954	107.9	97.6	146.4	68.1	125.4	125
1955	119.0	115.0	161.0	78.7	134.6	139
1956	125.8	117.2	172.4	85.0	141.7	143
1957	128.0	116.0	175.3	83.0	150.0	143
1958	117.0	91.0	175.0	68.0	140.0	134

Source: Minerals Yearbook and Federal Reserve Bulletin.

TABLE 4.—*National income by industrial origins*

[In millions of dollars]

	1950	1952	1954	1956	1957	1958
All industries	241,876	292,155	298,335	349,356	363,951	----------
Mining	5,010	5,237	5,021	6,265	6,191	----------
Metal	691	720	653	1,095	947	----------
Anthracite	282	254	159	168	171	----------
Bituminous coal	1,706	1,554	1,143	1,555	1,609	----------
Nonmetals	527	614	677	844	781	----------
Oil and gas	1,804	2,093	2,164	2,603	2,783	----------
Manufacturing	74,371	90,172	91,057	109,901	112,517	----------

Source: Survey of Current Business.

TABLE 5.—*Employment in U.S. mining industries, 1939 and 1952–59*

[Thousands]

Year	All mining	Metal mining	Iron ore mining	Copper mining	Lead-zinc mining	Anthracite	Bituminous coal	Nonmetals	Oil and gas
1939	845	103	----------	----------	----------	89	388	76	189
1952	885	99.8	33.5	26.5	21.2	63.4	327.8	103.8	289.8
1953	852	106.0	40.1	28.6	17.8	54.0	288.9	105.9	297.4
1954	777	99.3	35.2	27.9	16.4	41.1	226.7	105.1	298.8
1955	770	101.0	34.2	28.9	16.6	31.3	218.7	108.3	317.1
1956	807	108.3	35.1	33.3	17.4	29.3	228.6	115.2	324.8
1957	809	111.2	38.9	32.6	16.7	28.4	230.0	113.3	326.2
1958 (average):									
March	733	95.9	31.3	28.9	14.1	22.8	200.3	105.0	302.6
June	717	92.9	30.4	28.2	13.3	19.2	190.1	111.8	303.2
September	711	90.7	31.8	28.4	11.4	18.5	187.2	113.0	301.5
December	713	93.4	30.3	30.2	12.7	19.6	192.2	107.3	300.7
1959: March	686	92.8	----------	----------	----------	16.0	180.0	103.9	293.0

Source: Monthly Labor Review.

TABLE 6.—*Average hourly wages (gross earnings) in U.S. industries*

Year	Metal	Anthracite	Bituminous	Oil and gas	Nonmetals	Manufacturing
1939	$0.708	$0.922	$0.886	$0.873	$0.550	$0.633
1945	1.042	1.232	1.240	1.197	.886	1.023
1950	1.554	1.970	2.010	1.815	1.361	1.465
1952	1.86	2.26	2.29	2.09	1.58	1.67
1954	2.07	2.52	2.48	2.27	1.76	1.81
1955	2.19	2.53	2.56	2.32	1.82	1.88
1956	2.30	2.40	2.81	2.48	1.92	1.98
1957	2.42	2.63	3.02	2.61	2.00	2.07
December 1958	2.55	2.64	3.04	2.68	2.13	2.19
March 1959	2.57	2.77	3.19	2.81	2.13	2.22

Source: Monthly Labor Review.

TABLE 7.—*Reported consumption of principal metals and minerals in the United States*

[Thousands of short tons, unless otherwise stated]

Commodity	1950	1954	1955	1956	1957	1958
Antimony, primary [1] ..... short tons	35,181	12,180	12,470	14,962	11,931	.....
Barite, crude	754	1,216	1,460	2,035	1,671	.....
Bauxite, dried equivalent ..... 1,000 long tons	.....	6,428	6,984	7,751	7,633	.....
Chromite, gross weight	980	914	1,584	1,847	1,760	.....
Cobalt ..... 1,000 pounds	11,913	7,350	9,740	9,562	9,157	.....
Copper, refined	2,002	1,255	1,502	1,521	1,348	.....
Fluorspar, finished	434	480	570	621	645	.....
Iron ore, gross weight ..... 1,000 long tons	105,489	94,200	125,000	125,170	130,602	.....
Lead	1,407	1,095	1,213	1,210	1,108	.....
Magnesium, primary ..... short tons	20,599	39,220	46,460	53,610	43,811	.....
Manganese ore, gross weight	1,205	1,741	2,104	2,264	2,361	.....
Mercury ..... 76-pound flasks	45,503	42,800	57,190	54,143	52,889	.....
Mica splittings ..... 1,000 pounds	.....	6,733	8,998	8,662	8,037	.....
Molybdenum [2] ..... do	37,081	23,720	35,940	39,082	34,662	.....
Nickel (excluding scrap) ..... short tons	93,235	94,700	109,300	127,578	122,466	.....
Platinum metals ..... 1,000 troy ounces	503	582	851	859	746	.....
Tin ..... long tons	112,478	82,890	90,480	90,324	82,507	.....
Tungsten concentrate, W content ..... short tons	9,916	4,483	4,483	4,531	4,272	.....
Zinc, slab	1,144	1,120	1,120	1,009	936	.....
Anthracite	39,915	26,900	23,600	24,000	20,800	.....
Bituminous coal and lignite	460,428	363,060	423,412	432,858	413,700	.....

[1] Includes antimony content of antimonial lead from foreign and domestic ores after 1955.
[2] Molybdenum content of primary products (shipments to domestic destinations).

Source: Minerals Yearbook data.

TABLE 8.—*Price relatives for selected mine products and for selected mining cost items.*

[U.S. Bureau of Labor Statistics index numbers, 1947–49=100]

	1950	1952	1954	1955	1956	1957	1958
Average, all commodities	.....	111.6	110.3	110.7	114.3	117.6	.....
Coal	106.2	108.7	106.3	104.8	114.5	124.4	.....
Iron ore	.....	.....	157.7	160.5	173.0	181.7	.....
Nonferrous metals	.....	.....	124.2	142.7	156.1	137.4	.....
Fertilizer materials	.....	.....	113.0	111.6	108.4	106.8	.....
COSTS							
Coal	106.2	108.7	106.3	104.8	114.4	124.4	.....
Gas	98.2	103.7	108.8	111.6	114.3	116.1	.....
Petroleum products	103.7	109.3	110.8	112.8	118.2	127.0	.....
Lumber	.....	.....	117.3	112.4	127.2	119.7	.....
Explosives	.....	.....	121.8	125.0	130.5	136.7	.....
Construction machinery, etc	.....	.....	131.6	137.1	148.6	160.0	.....
Mining expenses [1]	96.2	113.1	127.6	119.7	128.2	132.9	.....

[1] This calculated composite excludes capital cost of contract work but allegedly gages impact of labor cost and productivity.

TABLE 9.—*Imports of principal minerals as a percent of net new supply in the United States*

[Percent]

Commodity	1953	1954	1955	1956	1957	1958
Ferrous ores, scrap and metals:						
Iron (equivalent)	8	14	14	20	21	18
Manganese (content)	89	86	80	82	87	86
Chromite (Cr_2O_3 content)	97	91	93	88	94	----
Cobalt (content)	84	85	87	79	79	----
Molybdenum (content)	----	----	----	----	----	----
Nickel (content)	95	95	92	90	87	----
Tungsten ore and concentrate (W content)	75	65	57	62	77	73
Other metallic ores, scrap, and metals:						
Copper (content)	33	37	30	30	31	14
Lead (content)	41	37	36	37	41	----
Zinc (recoverable content)	52	51	51	53	54	54
Aluminum (equivalent) [1]	75	74	75	[2] 79	[2] 85	83
Tin (content)	85	84	81	82	80	79
Antimony (recoverable content)	36	[3] 30	[3] 37	36	40	----
Cadmium (content) [4]	65	67	76	84	66	60
Magnesium (content)	2	1	3	----	1	----
Mercury [5]	85	72	41	66	57	51
Platinum group metals	87	90	96	93	91	86
Nonmetallic minerals:						
Asbestos	93	93	94	94	94	----
Barite, crude	26	26	25	31	42	----
Boron minerals and compounds	----	----	----	----	----	----
Bromine and bromine compounds	----	----	----	----	----	----
Clays	----	----	----	----	----	----
Fluorspar, finished	53	54	57	60	65	----
Gypsum, crude	28	28	28	30	32	----
Mica (except scrap)	94	97	99	96	100	93
Phosphate rock (P_2O_5 content)	1	1	1	1	1	----
Potash (K_2O equivalent)	7	6	8	9	9	----
Salt, common	1	1	1	1	3	----
Sulfur (all forms, content)	1	----	4	6	11	----
Talc and allied minerals	4	4	4	3	3	----

[1] Includes 85 percent of bauxite mine production (other than shipments) and imports and 91 percent of alumina imports, both converted to aluminum equivalent.

[2] Includes ingot equivalent (90 percent) of imports of scrap, which are largely scrap pig. Some duplication occurs because of small quantity of loose scrap imported. (See also footnote 1).

[3] Includes recovery in antimonial lead from foreign silver and lead ores.

[4] Primary shipments estimated as 40 percent of total primary production of metals, imports by the sum of the remaining 60 percent of such production plus imports of metal. Primary compounds not made from metal, data for which in certain years cannot be disclosed, are included. Secondary includes recovery from both old and new scrap.

[5] Secondary production omitted in years before 1954.

Source: Minerals Yearbook data.

TABLE 10.—*U.S. self-sufficiency in metals and mineral production*

Commodity	Year	Production	Imports	Consumption	Self-sufficiency (percent)
FERROUS METALS					
Iron ore, 1,000 long tons	1950	97,151	8,281	105,489	92
	1957	106,148	33,653	105,386	78
	1958	68,000	27,539	105,104	66
Chromite, 1,000 short tons	1950	(1)	1,304	1,453	0
	1957	166	2,064	1,572	10
	1958	144	600	1,221	12
Cobalt, 1,000 pounds (in ore)	1950	660	9,498	11,913	6
	1957	4,123	18,062	9,157	45
	1958	4,838	17,300	7,475	65
Manganese, 1,000 short tons	1950	431	1,835	1,650	26
	1957	367	2,222	2,374	15
	1958	317	2,353	4,267	7
Nickel, short tons	1950	913	89,200	93,235	10
	1957	12,900	140,000	122,466	10
	1958	13,490	108,000	149,448	9
NONFERROUS METALS					
Aluminum ore (bauxite), 1,000 long tons	1950	1,335	2,516	3,325	40
	1957	1,416	7,101	7,633	19
	1958	1,311	7,915	9,226	15
Antimony, short tons	1950	6,888	16,333	35,181	20
	1957	709	15,265	11,931	6
	1958	705	9,878	10,058	7
Beryllium, do	1950	559	4,860	3,007	19
	1957	521	7,290	4,309	12
	1958	520	5,000	6,200	8
Copper, 1,000 short tons	1950	909	608	1,447	63
	1957	1,086	594	1,239	89
	1958	980	520	1,133	91
Mercury, 76-pound flasks	1950	4,535	56,080	45,503	10
	1957	34,625	42,005	52,880	61
	1958	36,950	20,934	52,000	71
Platinum, 1,000 troy ounces	1950	38	428	503	8
	1957	19	687	745	3
	1958	15	674	457	3
Lead, 1,000 short tons	1950	451	552	1,407	32
	1957	325	531	1,088	30
	1958	266	352	988	28
Zinc, do	1950	623	393	1,144	55
	1957	539	795	3,232	44
	1958	403	728	908	44
NONMETALS					
Asbestos, short tons	1950	42,434	705,000	727,000	6
	1957	42,967	682,732	723,492	6
	1958	40,400	605,000	642,600	6
Barite, 1,000 short tons	1950	695	58	786	88
	1957	1,153	833	1,671	69
	1958				
Fluorspar, do	1950	302	165	434	70
	1957	329	631	645	35
	1958	339	415	494	48

[1] U.S. production of chromite in 1950 was 404 short tons.

Source: Minerals Yearbook data.

TABLE 11.—*Comparison of world and U.S. production of specified metals and minerals, 1950 and 1957*

[Quantities in thousand short tons]

Commodity	1950			1957		
	World	United States	Percent of world	World	United States	Percent of world
Fuels:						
Anthracite	155,000	44,077	29	157,700	25,338	16
Bituminous coal and lignite	1,842,000	515,829	28	2,409,405	490,000	20
Natural gas...1,000,000 cubic meters	203,000	177,860	88	(1)	(1)	
Petroleum, crude.....1,000 barrels	3,802,907	1,973,574	52	6,440,350	2,616,778	41
Nonmetallic minerals (other):						
Asbestos	1,400	42	3	2,050	44	2
Cement	145,000	43,300	30	1,443,993	313,756	22
Diamonds.....1,000 carats	15,250			20,800		
Fluorspar	870	302	35	1,775	329	19
Graphite [1]	149	6	4	330	(2)	(2)
Gypsum	25,100	8,193	33	33,900	9,195	27
Mica	115	70	61	175	93	53
Nitrogen, agricultural [1] (fiscal year)	4,090	1,160	28	[3] 7,826	2,230	28
Phosphate rock	24,200	11,500	48	32,350	13,976	43
Potash (K_2O equivalent)	4,850	1,278	26	8,700	2,268	26
Pyrites	12,800	1,040	8	19,000	1,190	6
Salt	53,000	16,616	31	77,400	23,854	31
Sulfur, native.....1,000 long tons	5,700	5,192	91	7,300	5,579	76
Metals, mine basis:						
Antimony [1] (Sb content)	48	2	3	53	(4)	1
Bauxites	8,000	1,335	17	18,700	1,416	8
Chromite	2,500	(5)	(6)	4,500	166	4
Copper (Cu content)	2,770	909	33	3,870	1,086	28
Gold.....1,000 troy ounces Au	32,500	2,289	7	39,080	1,800	5
Iron ore	243,000	97,151	40	422,135	106,148	25
Lead	1,815	431	24	2,540	338	13
Manganese ore	5,300	134	2	13,000	366	3
Mercury.....1,000 flasks Hg	143	5	3	235	33	14
Nickel (Ni content)	160	1	(6)	314	10	3
Platinum group 1,000 troy ounces Pt, Pd, etc	600	38	6	1,190	19	2
Silver.....1,000 troy ounces Ag	198,600	42,406	21	228,700	38,720	17
Tin.....1,000 long tons Sn	169	(7)	(8)	186	2	1
Tungsten (60 percent WO_3)	43	5	12	73	6	8
Zinc (Zn content)	2,340	623	27	3,420	532	16
Metal, smelter basis:						
Aluminum	1,650	720	44	3,730	1,648	44
Copper	2,960	911	31	4,040	1,178	29
Iron, pig (including ferroalloys)	148,000	66,400	45	232,900	81,144	35
Lead	1,870	505	27	2,490	533	21
Magnesium	45	15	33	168	81	48
Tin.....1,000 long tons	196	33	17	186	2	1
Zinc	2,167	843	39	3,230	986	31

[1] Exclusive of U.S.S.R.
[2] Bureau of Mines cannot publish U.S. figure separately.
[3] Year ended June 30, 1957.
[4] In 1957, U.S. production of antimony was 709 short tons.
[5] In 1950, U.S. production of chromite was 404 short tons.
[6] Less than 1 percent.
[7] In 1950, U.S. production of tin was 94 long tons.

APPENDIXES

APPENDIX A

Summaries of Individual Mining Industries

ALUMINUM AND BAUXITE

The United States is the world's largest producer of ingot aluminum, supplying approximately 45 percent of the total, but depends principally upon Jamaica and Surinam for raw material. Bauxite, the only commercial ore of aluminum, is produced domestically almost entirely (98 percent) by captive mines in Arkansas; minor quantities, mostly for nonmetallic uses, are mined in Alabama and Georgia. Domestic bauxite is inferior in grade to imported, but measured reserves would maintain current production for 40 years at current rates. Clays and various other silicates are nonconventional raw materials which may be utilized in case of prolonged emergency.

Notwithstanding tremendous expansion of the aluminum industry, during and since World War II, imports of the metal (principally from Canada, a lower cost producer) are large (over 280,000 tons per year) and exports are relatively small (80,000 tons per year).

Present large capacity (2,224,000 tons per year) is not fully utilized. Estimated 1958 production is 2,080,000 tons. Stocks increased alarmingly in 1956 and 1957 and output was curtailed but new potlines are now being activate and consumption is once more rising both in the United States and abroad.

Offerings of Russian metal have threatened world markets, but actual exports from the Soviet bloc have been virtually negligible as yet.

Since 1952, ingot aluminum prices have ranged from 20.2 to 28.1 cents per pound. Current quotation is 24.7 cents. Tariff duty, formerly 4 cents and presently 1¼ cents per pound, on the metal is equivalent to about 5 percent ad valorem. The bauxite duty, formerly $1 and presently 50 cents per long ton, is equivalent to only about 3 percent ad valorem and has been suspended until July 16, 1960.

Stockpile inventories of bauxite and of ingot exceed maximum objectives. Only one primary producer can still sell ingot to the Government under the "put right" clauses of expansion goal contracts.

Industry spokesmen have indicated a view that aluminum should not be forced to suffer adverse discrimination if competitive metals (e.g., copper, lead, and zinc) qualify for Government assistance.

ANTIMONY

During World War I, U.S. production of antimony established an alltime record. However, the Yellow Pine mine of Bradley Mining

Co., Stibnite, Idaho, which produced 75 percent of the domestic mine output, suspended operations in 1952. In this mine the antimony ores were associated with tungsten and gold but reserves containing economic gold values have been mostly worked out. The antimony production of the Sunshine Mining Co., Shoshone County, Idaho, virtually the only remaining antimony producer, is a byproduct of lead-silver ores. Very small and sporadic outputs of antimony ores have been reported from Alaska and various Western States, but 50 to 70 percent of known U.S. reserves are in the Yellow Pine mine. However, many domestic mine ores contain minor quantities of antimony that eventually report as a byproduct in the smelter.

About two-thirds of the annual smelter output (10,000 tons in 1957) is derived by nine companys from ores and concentrates imported from Mexico (50 percent), Bolivia (20 percent), Union of South Africa (20 percent), and other countries (10 percent). Imports of metal and antimony oxide, principally from Europe, accounted for somewhat less than one-half the annual new supply of primary antimony.

The consumption of primary antimony in the United States fluctuates widely, but has tended to decline in recent years. In 1957, it dropped to 10,000 short tons versus the 1948–52 average of 17,412 short tons.

Secondary antimony production, mostly recovered in alloys such as battery lead, totaled 19, 200 tons in 1958 versus a general level of 22,000 to 24,000 tons in 1952–57.

Antimony imported in ores or concentrates is free of duty. Tariff rates on metal and oxide are 2 cents per pound and 1 cent per pound (gross weight), equivalent to about 6 percent and 4 percent ad valorem, respectively.

Prices of antimony metal in New York have held at 29 cents per pound in recent months but fluctuated widely in most earlier years. During World War II the average was about 15.5 cents, but during 1949 the range was from 33.78 to 40.23 and in the 12 months of 1952, quotations declined from 51.85 to 36.47 cents.

Antimony has several important strategic uses although its military importance was sharply reduced after shrapnel became obsolete. Domestic deposits are relatively small and low grade even as compared with those in Mexico, Bolivia, and the Union of South Africa. Reserves in what is now Red China are of the order of 2 or 3 million tons, far in excess of the free world total. Before the long war with Japan, China supplied nearly two-thirds of the annual world output but Chinese production in 1957 is estimated at only 16,500 tons. By reason of its huge reserves, ability to produce high purity metal and compounds, and low mining costs, China possesses a capability of regaining its dominant position in the world antimony market.

ASBESTOS

The captive mine of a major consumer near Eden, Vt., is the only large asbestos producer in the United States. Small quantities of amphibole asbestos are mined in California and North Carolina. The only know domestic deposits of low-iron chrysotile asbestos are in Arizona. Formerly this peculiar type of asbestos fiber was available commercially only in Northern Rhodesia and supplies were critically short during World War II. The principal use is for electrical insulation. Under Public Law 733, 84th Congress, purchases of Arizona

fiber of suitable quality were consumated and there has been considerable agitation for Government financing of a mill in this area. However, large deposits of low-iron chrysotile asbestos of superior quality have been opened up in British Columbia, thereby virtually eliminating the strategic importance of the small, scattered domestic deposits.

BARITE

Domestic consumption of barite expanded rapidly from less than 400,000 tons in 1939 to a record 2,035,000 tons in 1956.

Although supplies were critically short during World War II the shortage was due primarily to lack of labor and materials for expansion of the industry. Adequate supplies are largely a matter of plant capacity and consequently no barite has been acquired for the national stockpile. Domestic barite deposits are numerous and widely distributed. Total known commercial reserves in the United States have been estimated to exceed 40 million tons. About 75 percent of the domestic production now comes from Arkansas and Missouri, although significant quantities are mined in the Southeastern States, in Nevada, and in various other Western States.

Imports have increased even faster than domestic production, reaching a record total of 832,626 tons in 1957. Canada, the leading source for more than a decade, dropped to third place in 1957. Mexico replaced Canada in first place and Peru ranked second.

Several large domestic mines were idled in 1958 but this may be attributed to reduced demand rather than to foreign competition. Most of the ground barite used in drilling is consumed in the Louisiana and Texas gulf coast areas. In 1958, however, imports of crude barite for processing at gulf plants were reduced, notwithstanding the fact that ocean freight rates were at their lowest level in many years. Actually the foreign deposits which furnish the bulk of the imports are owned or operated by major American mining companies who are also consumers and consequently the ratio of imports to domestic production is largely determined by company policy. The present tariff duty of $2.55 per long ton, reduced from $4, is equivalent to about 15 percent of the U.S. delivered price.

BERYLLIUM

Beryl, at present the only commercial beryllium ore mineral, is mined as a coproduct of feldspar, mica, and/or other pegmatite minerals. Almost 200 mines, in about a dozen States, produced more or less beryl, chiefly as a byproduct, but domestic production is of the order of only 500 tons a year whereas industrial consumption has increased rapidly from 1,948 short tons in 1954 to 6,200 tons in 1958.

Free world production of beryl is presently estimated at 9,500 short tons a year. Most of this has been shipped to this country for industrial consumption and stockpiling. During the Korean emergency visible stocks were depleted and free world supplies scarcely sufficed for U.S. consumption. Inventories under the Stockpiling Act at present, however, exceed the present procurement priority and minimum objective and industrial stocks are fairly large.

On October 7, 1952, the GSA announced a program for purchasing beryl from small domestic producers at prices higher than those

prevailing in the domestic markets. The three mica purchase depots in Spruce Pine, N.C., Custer, S. Dak., and Franklin, N.H., were authorized to accept up to 25 tons of beryl a year from individual producers. Payments are on a sliding scale up to $50 a short ton unit for commercial grade (10 percent BeO and over) which compares with the 1959 nominal quotation of $28 to $31 for commercial ore. This program was originally scheduled to terminate on June 30, 1957, or when 1,500 dry short tons of ore had been purchased but it was subsequently extended until June 30, 1962, or until 4,500 tons had been received. As of December 31, 1958, only about one-half of the latter tonnage had been acquired.

Beryl deposits may be eligible for exploration loans up to 50 percent of approved costs; formerly the DMEA allowance was 75 percent.

Beryllium is an element that commands potentially greater importance to the Military Establishment and to the AEC. Domestic resources in pegmatite deposits, which allow recovery by hand sorting, are small and there is no assurance that world supplies are adequate. It is hoped, however, that new sources can be developed. The lithium-bearing pegmatite belt in the Carolinas, for example, contains about 0.4 percent beryl and represents a potential of almost a million tons—provided it can be recovered economically.

CHROMITE

The United States consumes 50 percent of the world's output of chromite, but its requirements are met almost entirely by imports—about 50 percent from African countries, 25 percent from the Philippines, and the remainder from Turkey and a number of relatively small producing countries. Reserves of more or less specification material in California and Oregon are small and production from these deposits is not likely to exceed 2 percent of requirements even at prices far above a commercial market. Production from these mines are sold almost entirely in recent years to the Government at incentive prices.

Estimated reserves of off-grade and currently noncommercial ores in lode deposits of southern Montana (1 or 2 million tons Cr_2O_3) are a substantial resource which could probably be greatly expanded by further exploration. In 1957 the Geological Survey estimated measured, indicated, and inferred reserves in the continental United States, excluding Alaska, at 3.5 million tons Cr_2O_3.

The DPA contract with the American Chrome Co., the only Montana producer, called for the purchase of 900,000 tons of concentrates, minimum 38 percent Cr_2O_3, in 8 years. Owing to the low chromic oxide content and chrome-iron ratio, these concentrates are not commercially usable in their present state for either metallurgical, chemical, or refractory uses. Processes for utilizing this material have been developed but are quite costly.

Free world consumption of chromite is growing rapidly and may double the present annual rate of 2 million tons by 1970. Reserves in Rhodesia and the Union of South Africa are amply large but railroad and port facilities are inadequate and preference may be given to other commodities. Accordingly, many persons believe that the problem of using domestic ores may become more important. Canada also has large low-grade reserves similar to those in the Stillwater complex in Montana. Consideration may also be given to Cuban laterites.

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Chromite is on the free list of the Tariff Act of 1930. Tariff rates on chromium metal and various other products were reduced in 1957 under GATT, but imports under the dutiable classifications are relatively small.

The DPA chromite purchase program terminated in mid-1958 when the 200,000 long dry ton limit had been accepted. Stockpile objectives for each of the various grades of chromite had already been equaled or exceeded. The base price of $115 per long dry ton for standard grade 48 percent metallurgical lump under this program compared with a maximum of $46 paid for Turkish ore of similar specifications.

COBALT

The principal producer of cobalt concentrates in the United States is the Calera Mining Co. in Idaho, a subsidiary of the Howe Sound Co. Smaller amounts are produced as byproduct from domestic ore by Bethlehem Cornwall Corp. in Pennsylvania and National Lead Co. in Missouri. Domestic mine production in 1958 was about 4 million pounds and consumption around 15.3 million pounds.

World production increased from a 1948–52 average of 8,200 short tons to 16,000 tons in 1956 and declined moderately to 15,500 tons in 1957 and 14,000 tons in 1958. Much of this expansion was stimulated by U.S. stockpile purchases which were completed except for two purchase contracts covering 85 percent of domestic production: Calera, 6,501,000 pounds by December 31, 1959, and National Lead, 7,320,000 pounds by 1962.

Inasmuch as productive capacity greatly exceeds current industrial consumption, domestic producers are faced with intensified competition. In the Belgian Congo, which produced as much as 10,019 tons cobalt in 1956, about two-thirds of the world total, the cobalt is largely a byproduct of copper mining and smelting. Other important producing countries are Canada, Northern Rhodesia, and Morocco. Smaller amounts of cobalt are also recovered in smelting copper and/or nickel ores from several countries.

The U.S. Government has a contract with Freeport Sulphur to recover cobalt from Nicaro, Cuba.

COLUMBIUM-TANTALUM

The domestic columbium mining industry comprises one large placer operation which is operated by Porter Bros. Corp. in Valley County, Idaho, and which supplies under Government contract 99 percent of the domestic concentrates production. Byproduct uranium, thorium, and rare earths are also recovered from this operation. The remaining 1 percent of the domestic output of columbium-tantalum ore is a sporadic byproduct of a dozen or more pegmatite mines in Arizona, Colorado, Maine, New Mexico, North Carolina, and South Dakota.

The United States is the major consumer of these two metals, accounting for 60 to 85 percent of free world total output. Nigeria has been the principal producing country, followed by Belgian Congo and Norway. Some production is reported from other African countries, South America, Australia, and the Spanish Peninsula. World reserves of tantalum appear to be quite small. But columbium (largely as pyrochlore) is moderately abundant in Brazil, Africa, and

Canada. Columbium occurs in titanium ores in Arkansas and elsewhere but is not economically recoverable.

The estimated world production of columbium- and tantalum-mineral concentrates rose to an alltime record of 11.5 million pounds in 1955 compared with the annual 1948–52 average of 2.8 million. This expansion was largely the result of U.S. Government expanded purchases. On May 28, 1952, the Defense Materials Procurement Agency began buying domestic and foreign columbium and tantalum ores, paying an incentive bonus of 100 percent of the specified price to actual producers. Later, the GSA was authorized to continue buying foreign ores until December 31, 1956, and domestic ores until December 31, 1958, or until 15 million pounds of contained pentoxide (Cb_2O_5 plus Ta_2O_5) of both domestic and foreign origin was purchased. Public Law 733, 84th Congress, which provided for the purchase of domestically produced columbium-tantalum concentrates, expired December 31, 1958. The Government contract with Porter Bros. Corp., for delivery of 1,050,000 pounds of oxides has a time limit of June 1961.

All stockpile objectives have been filled.

Imports of ores and concentrates of these materials are duty free. At the peak of the purchase program in 1955, they rose to 5,760 short tons, later dropping to 2,088 tons in1957 and about 2,000 tons in 1958. Tantalum-mineral concentrates are imported principally from Belgian Congo and Brazil with several other countries contributing minor amounts. Ordinarily, at least 50 percent of the imports of high-columbium concentrates are from Nigeria.

Prices of typical mixed columbian-tantalum concentrates dropped sharply from $3.40 to $1.35 per pound of contained pentoxide content in 1955. The current quotation is $1.05 to $1.10.

The OME participation in approved exploration projects is 50 percent, formerly 75 percent.

COPPER

In contrast with the severe slump in late 1957, the current copper outlook is encouraging; however, the world's economic condition must improve even further before consumption catches up with productive capacity.

After rising to peak levels during World War II, U.S. copper production fluctuated within rather narrow limits before reaching a new peak of 1,106,215 tons in 1956, only slightly higher than the previous record of 1,090,818 tons in 1943. Of the total U.S. output in 1957, Arizona supplied 47 percent, Utah 22 percent; the remaining 31 percent was mined mostly in Montana, Nevada, New Mexico, and Michigan, with smaller tonnages in a half dozen other States.

Historically, the United States used to be a major exporter of copper but domestic consumption has exceeded production from domestic mines in every year since 1939. Whereas the domestic mining has remained almost stationary, production in foreign countries has expanded greatly and further substantial additions to world capacity are still being made. Free world consumption outside of the United States continued to increase substantially to an alltime high in 1957 and continued at close-to-record levels in 1958 with some further gains in 1959.

Since world production has increased faster than consumption, producers' stocks of refined copper and metal in process began to increase in 1956 and soon reached unwieldy proportions. After midyear 1958, gradual improvement in consumption, combined with a drastic reduction in imports and some cutbacks in production, inventories declined to normal proportions; however, as operations are stepped up at domestic mines and production in other countries increased, supplies once more threaten to top demand by a fairly wide margin.

After a 7-year suspension, the excise tax on copper was reimposed on July 1, 1958. The effective rate was reduced to 1.7 cents per pound as a result of the GATT meetings in 1956 and it remains in effect when the price of cooper is 24 cents a pound or more. Should the price drop below 24 cents, it would increase to 2 cents.

Reimposition of the excise tax, in effect a tariff on imports, coincided with the improvement in U.S. consumption and doubtless contributed to the net outflow of unmanufactured copper during the latter part of the year. It does not follow, however, that this was the major cause of the improvement in the domestic mining picture.

The price of electrolytic copper f.o.b. refinery, as reported by the Engineering and Mining Journal, rose above 46 cents per pound in March 1956, but dropped below 36 cents by November of that year and reached a low point of 25 cents in January 1958. After reimposition of the 1.7-cent excise tax, the price rose to 26.5 cents in July and to 29 cents in October where it held until early 1959 when it progressively advanced to 31.5 cents.

Whereas copper mine wages have increased along with wages in other industries, labor productivity has also increased. The quantity of crude ore mined per man-hour in 1957 was 49 percent above the 1947–49 average and notwithstanding the reduction in working hours, the output per worker increased 38.1 percent. In terms of recoverable metal, however, the apparent improvement in efficiency was much less because the average grade of ore mined was lowered.

A peril point of 24 cents per pound of copper was established in April 1951, but production costs, as reported by Arizona producers, have subsequently increased by 36.1 percent indicating that the peril point today is 32.66 cents. Clyde Weed, Anaconda Copper Co. board chairman, recently stated that African copper is produced at a cost of between 18 and 20 cents per pound and the large mines in Chile can recover copper at a cost somewhat less than that of Rhodesian copper. Because of molybdenum and gold credit, the lowest cost U.S. mine (presumably Kennecott's Utah Copper property), he said, mines copper at about 15 to 16 cents per pound. However, the top third of our domestic production requires a copper price of 28 cents to operate profitably for any period of time.

FLUORSPAR

Production of finished fluorspar from domestic mines has always been able to meet domestic requirement when the price was high enough. During World War II, consumption more than doubled. Whereas formerly the bulk of the demand originated in the steel industry, a variety of other uses developed after 1941 and domestic consumption rose from a peacetime maximum of less than 200,000 tons a year to 520,197 tons in 1952, and 644,688 tons in 1957. By 1960 it is expected to reach 700,000 tons.

Domestic production reached an alltime peak of 413,781 tons in 1944 but subsequently declined irregularly and since 1952 has fluctuated in the range of from 268,400 tons (1958) to 329,700 tons (1956).

Most of this decline in production has been in the output of metallurgical grade fluorspar. Production of ceramic-grade fluorspar (93 to 94 per cent CaF_2) has declined to a smaller extent whereas that of acid-grade fluorspar reached an alltime high of 225,261 tons in 1957.

Government purchases for stockpiling, and subsequently under Public Law 733, helped to expand domestic production of acid-grade fluorspar and nine of the independent flotation mills operated under this latter program were forced to close when the law expired on December 31, 1958. Captive mines, operated by aluminum and chemical companies to supply material for their own use are another factor in the growth of this acid grade fluorspar ndustry.

Whereas this duty on metallurgical grade fluorspar is substantially higher than that on acid grade, domestic miners were at a disadvantage in competition with foreign suppliers in delivered costs at important American markets and to some extent because of quality specifications. Inventories of this grade of spar acquired under the Stockpiling Act are still short of this procurement priority level. Beginning in 1957 domestic producers were given preference on substantial purchases and the Government has absorbed the freight charges As a result of these actions, domestic production of metallurgical grade fluorspar revived somewhat in 1958.

Between 1950 and 1958 trade journal quotations of acid-grade fluorspar ranged from $40 to $60 per short ton and of metallurgical grade from $35 to $43. Tariff duties on acid grade (plus 97 percent CaF_2) and metallurgical grade fluorspar are currently equivalent to $1.875 and $7.50 per short ton corresponding to approximately 3.9 percent and 24 percent respectively, of the United States price on January 1, 1959, less duty.

The postwar expansion in production of fluorspar outside of the United States has been almost worldwide. Imports into the United States formerly came principally from overseas but Mexican production was stepped up during World War II and recently accounted for 60 percent of the total foreign fluorspar consumed in this country. At present, by far the bulk of our metallurgical fluorspar is mined in Mexico. Substantial tonnages, almost entirely of acid grade, are also imported from Italy, Spain, and until recently, Canada; smaller tonnages come from several other countries. Imports from Canada dropped sharply in 1957 as the St. Lawrence Fluorspar Corp. of Newfoundland, Ltd., suspended mining following expiration of its U.S. Government contract early in the year. Barter transactions have been only a minor factor in expanding imports.

Mexico is the dominant factor in the current fluorspar situation in the United States. Although not much deep mining has been done in Mexico, surface showings are widespread and estimated reserves are huge.

Before World War II, fluorspar production in the United States was largely confined to a relatively small area on both sides of the Ohio River in Illinois and Kentucky. Illinois is still the largest producing State, and while Kentucky's production has become relatively less important, this area is credited with the major portion of its known domestic reserves. Operations at many mines, however,

are seriously handicapped by heavy flows of water and costs tend to be high. Increasing demand for acid-grade fluorspar which is acceptable in the form of flotation concentrates and which command higher prices than metallurgical grade has encouraged production in several Western States, especially in Colorado and New Mexico and more recently in Montana. Western mines, however, are handicapped by transportation costs to major markets and cannot compete with Mexican fluorspar, most of which moves at least part way by barge.

Increaseing amounts of fluorine are recovered as a byproduct of the treatment of phosphate rock and imports of natural cryolite (which is mined only in Greenland) have continued but these sources are relatively unimportant factors in the competitive situation.

GOLD AND SILVER

Owing to their wide use in coinage, the production of the precious metals involves special economic features that differ in many important respects from those of other mining industries. Throughout the world the straight gold-mining industry has been squeezed between rising labor and supply costs and a fixed price of $35 per fine troy ounce for its product. The price of gold was boosted from $20.67 to $35 per ounce by Presidential proclamation on January 31, 1934. Silver prices have fluctuated rather widely in the past but since 1933 the domestic output of newly mined silver has been bought by the U.S. Treasury at prices which have usually been higher than the open market price. On July 31, 1946, Congress established the seignorage deduction at 30 percent, thus increasing the Treasury price to $0.90505 per fine troy ounce.

Whereas gold mines in some countries have been aided by subsidies, tax concessions, currency devaluation, and/or sales of their product at premium prices on the "free market," domestic miners have been held down to a price which brought prosperity to the industry through the 1930's but which does not reflect inflationary trends of later years. Another factor was the wartime closing of domestic mines by the War Production Board Order L–208 and other official restrictions denying gold and silver mines equipment, supplies, and even manpower. The order was lifted July 1, 1945, but after 2½ years of unproductivity many of the mines were never reopened and others suffered financial losses that were never recouped.

The production of gold from U.S. mines in 1957 reached the lowest peacetime level in more than 60 years and subsequently, due to the cutback in base metal production, declined further. Only 1,736,352 ounces were produced in this country in 1958. South African production, on the other hand, increased to an alltime high of 17,656,447 ounces, up nearly 4 percent over the preceding year. Several factors have contributed to the prosperity of the industry in the Union of South Africa which currently yields 60 percent of the free world output of the yellow metal. Among these factors may be mentioned the opening of new mines in its Orange Free State, the devaluation of the pound, and credits from uranium. Gold subsidy programs remain in operation in Canada, Australia, and Colombia and are under consideration in Ghana.

South Dakota continues to rank as the leading gold-producing State by a wide margin, followed by Utah, Alaska, and California. About

75 percent of the total U.S. output comes from these four States, the remainder from a dozen or more smaller producing States, mostly in the West. Next to the Homestake mine, which accounts for most of the Idaho output, the second largest producer of gold is the Utah Copper mine. The two companies owning these mines supply about one-half of the total domestic gold production. In 1957, 38 percent of this total was a byproduct of base-metal ores, 43 percent was recovered from precious metal ores and 19 percent from placer mines. Of the 25 mines that supplied 87 percent of the 1957 output, 8 were lode mines, 5 were placer mines (mostly in California and Alaska), 8 were copper mines, 1 was a lead-zinc mine, and 3 were copper-lead-zinc mines.

Idaho is also the leading silver-producing State. Utah and Montana vie for second place followed usually by Arizona. Almost two-thirds of the output of domestic silver comes from the three principal districts: Coeur d'Alene region in Idaho; Summit Valley (Butte) district in Montana; and West Mountain (Bingham) district in Utah, in the order named. Of the 25 leading domestic silver-producing mines in 1957, only 4 depended chiefly on the value of silver in their ores. The Comstock lode and other deposits famous for their rich silver contents, were depleted many years ago. Not only in the United States but throughout the world, the production of silver is largely dependent today upon the mining of copper, lead, and/or zinc with which it is commonly associated. Since the overall revenue per ton of ore largely determines the economic potential of a given deposit, a fair price and a good market for silver encourages the production of the associated metals and vice versa.

The alltime high in annual world production of silver was approximately 278 million ounces in 1937 and for the United States alone the peak was nearly 75 million in 1915. In 1946, world output had slumped to less than 140 million ounces for which the United States contributed about 30 million. World production has subsequently increased fairly steadily to 204.7 million ounces in 1958 while domestic production has remained almost stationary until 1958 when it declined.

Mexico has been the principal silver-producing country for more than two centuries but since 1930 its output has greatly declined, actually as well as relatively. The United States still ranks second followed by Canada and Peru but production has increased rapidly in other countries, especially in Europe, Asia, and Africa.

Industrial consumption of silver in the United States accounts for nearly one-half of the world's total production. Most of the imports in recent years have comprised returns against lend-lease obligations but most of the mine production from the Western Hemisphere is also exported to this country. Whereas the spread between the free market and the Treasury price in June 1947 was over 30 cents an ounce, the differential has recently almost disappeared. Continued expansion in industrial requirements has led to predictions that prices will go up above the Treasury price of 90.5 cents. U.S. Treasury stocks have been reduced to 202 million ounces. Withdrawals have recently been at a rate of 80 million ounces annually, about evenly divided between coinage and sales to industry whereas U.S. mine production averages of about 35 million and free world consumption for all purposes apparently exceeds current production by as much as 25 percent.

However, since silver as well as gold are tied in with currency problems, predictions based on estimated mine production versus apparent demand may be greatly modified by political actions in several countries or by release of privately hoarded stocks.

GRAPHITE

Certain qualities of natural graphite, normally produced only in Ceylon and Madagascar, are strategically important and are not readily duplicated from domestic deposits, even at high cost. Inventories of all strategic grades acquired under the Stockpiling Act substantially equal or exceed present interim basic and maximum objectives and all special Government programs aimed at stimulating domestic production have been terminated.

One mine in Texas which produced crystalline flake graphite and another in Rhode Island which yields amorphous graphite, comprise the present domestic graphite mining industry. Wartime operations in Alabama and in Pennsylvania have been abandoned.

IRON ORE

Forecasts of probable sources of iron ore supplies for the U.S. iron and steel industry indicate that domestic production will remain virtually stationary around 100 million long tons a year and that the rapidly growing additional requirements will be supplied by imports. The principal foreign supplier will be eastern Canada which has recently developed huge reserves which have become more accessible to American furnaces as a result of the St. Lawrence Seaway. The Lake Superior region, which includes the vast iron ranges in Minnesota, Wisconsin, and northern Michigan should continue to supply around 80 million long tons a year. Although production of the Mesabi and certain other easily mined direct shipping ores continues to decline, owing to progressive depletion of its high grade deposits, production of concentrates and agglomerate from taconite deposits in Minnesota and from jaspilite deposits in Michigan is increasing. The Southeastern States, principally Alabama, produced 6 percent of total domestic output of usable iron ore in 1947 and the Northeastern States—New York, Pennsylvania, and New Jersey—5 percent. The most important producing area in the Western States is southern Utah but the aggregate production from Wyoming, California, Nevada, Colorado, Missouri, New Mexico, Texas, Washington, Montana, Arkansas, and Kentucky is substantial. Local changes in production in several of these minor producing States are likely to occur but the total output from all domestic districts outside its Lake Superior region is expected to remain around 20 million long tons a year.

KYANITE

Two firms, one in Virginia and one in South Carolina, comprise the kyanite mining industry of the United States. Production figures are confidential but employment at these mines is estimated as 65 persons.

Before, during, and for some time after World War II, Indian lump kyanite, by reason of its special physical structure, was a highly strategic material, but synthetic mullite is now available and is at

least as good and possibly a superior replacement for Indian kyanite. Whereas exports of kyanite, as well as other minerals, from India have been embargoed from time to time, mullite is produced by sintering or fusing Western Hemisphere raw materials, principally domestic. Imports of kyanite from India and from certain African countries have continued but only on a much reduced scale.

LEAD AND ZINC

Since 1949, U.S. consumption of lead has remained fairly stable around 1 to 1.2 million tons a year and consumption of slab zinc and certain other zinc products has fluctuated to within similarly narrow limits around 1.1 million tons a year. Mine production during this period has declined irregularly while imports have increased greatly.

As early as May 10, 1950, the lead industry petitioned the Tariff Commission for "escape clause" from the cut in duty under the Mexican Trade Agreement. This agreement was subsequently canceled. But later, following the cuts in duties on both lead and zinc at Torquay effective June 6, 1951, the lead-zinc industry again petitioned the Tariff Commission which eventually undertook a cost investigation. On May 21, 1954, the Commission made a unanimous finding that serious injury was resulting from excessive imports and recommended maximum permissible increases in duties. In lieu of accepting these recommendations, however, the President authorized increased stockpile purchases and later initiated barter. He also directed the Secretary of State to urge foreign exporters not to take unfair advantage of the alternative programs.

In 1957 the barter program was reevaluated by the Department of Agriculture with the result that few barter contracts were made after April 30 and GSA purchase programs were terminated in 1958. On April 24, 1958, the Tariff Commission concluded a second study of the lead-zinc industry and unanimously reaffirmed the finding that imports were causing serious injury. It split in regard to recommendations. Three Commissioners recommended returning to the 1930 tariff rates and three recommended the higher rates of the previous decision plus quotas. The President took no action on either of these recommendations because the Seaton bill embodying the administration-favored subsidy plan was before Congress. When this bill failed to pass, the administration on September 22, 1958, announced the imposition of quotas on metal and ore. The quotas are based on 80 percent of the 5-year average imports, 1953–57.

As compared with the 1947–49 average of 16 cents, the New York price of lead metal dipped in August 1958 to 10.75 cents, came back to 13 cents in October (following the establishment of quotas), but dropped to 12 cents in January 1959, the current (June 1959) quotation. The price of zinc remained steady at 10 cents from July 1957 until the last quarter of 1958 when it began to stiffen even before the import controls moved the market to 11.5 cents. The latter price compares with the 1947–49 average of about 12 cents.

Although the statistical position of zinc has begun to stabilize and the lead situation shows signs of improvement, present-day prices are not remunerative for most domestic producers. Many mines are shut down while others are able to continue in operation only by unduly depleting their higher grade ore reserves and postponing normal exploration and development.

The impact of the long continued depression in the lead-zinc industry has been uneven. In the tristate region of Kansas, Oklahoma, and Missouri, production has been virtually at a standstill since July 1957. The depressed conditions in this area have been described in the report of the special Subcommittee on Coal of the House Interior Committee headed by Representative Ed Edmondson.

In comparison with the base years, 1947–49, the Western States which then supplies 60.5 percent of the domestic lead mine output and 57.4 percent of the zinc mine output have shown greater drops than the national totals. By contrast, production of zinc in eastern Tennessee has increased, as a result of new discoveries; and several other districts have managed to avoid drastic curtailment of operations although often showing a loss on the books.

LITHIUM MINERALS

Lithium ore mining was a very small industry before World War II and the value of lithium ores mined in the United States did not exceed $600,000 a year until 1951. It rose to $3 million in 1954 and continued to expand rapidly thereafter. Later figures, however, cannot be released. Import statistics likewise are not available but they, too, have expanded greatly. Principal sources are Canada, Federation of Rhodesia, and Nyasaland, and South-West Africa. Domestic mines are in North Carolina and South Dakota and a complex lithium phosphate is an important byproduct from the brines of Searles Lake, Calif.

The rapidly growing demand for lithium was sharply accelerated by AEC contracts to purchase lithium hydroxide from the three principal domestic producers. In 1958, when the Commission announced that it would need no more of this material, an oversupply of lithium minerals and chemicals developed. Although deliveries under contracts to two producers may continue to December 31, 1959, substantial cutbacks in production have occurred at domestic mines. Canadian and African mines, which supply substantial imports into the United States, have been operating well below capacity and now the flow of imports into the United States may be augmented by substantial additional tonnages of high analysis mineral (amblygonite) from Brazil.

MAGNESITE

Already more than one-half of the magnesia produced in the United States is derived from sea water, well brines, and bitterns, and the proportion derived from mine products (magnesite, brucite, and dolomite) continues to decrease. Before World War I, Austria supplied most of the world's magnesite with small quantities from Greece. Deposits in California then furnished only 4 percent of U.S. requirements, but when foreign supplies were cut off after 1914, they were actively exploited and a large new source was opened at Chewelah, Wash.

Between the two World Wars, about 70 percent of the refractory magnesia used in the United States was produced from domestic crude magnesite, about three-fourths from Washington and one-fourth from California mines. California deposits have been largely exhausted and no magnesite is currently being mined in that State. Northwest

Magnesite Co. in Washington has continued to be the leading producer of domestic magnesite, but two companies are mining magnesite and/or brucite in Nevada. In a letter dated March 25, 1958, J. C. Stivers, secretary of the Northwest Magnesite Co., pointed out to the Senate committee that expansion of facilities for producing dead-burned magnesite both in Washington and at the company's sea water plant at Cape May N.J., was requested by the Government, which granted certificates of necessity for fast tax writeoffs. Investment in these plants totals $17 million. The letter stated that the Washington operation was shut down and that the Cape May plant was operating at only one-third of capacity.

Imports of dead-burned magnesite from Austria, hitherto the principal foreign source, were reduced in 1957, but those from Yugoslavia have recently assumed major importance and pose a substantial threat to the domestic industry. Yugoslavia is also the principal source of the small imports of caustic calcined magnesite. It has been stated that the Yugoslav industry was largely assisted by American dollars and know-how.

From 1922 until 1951, the tariff on dead-burned magnesite was $11.50 per short ton, but this was reduced after the Torquay Conference to $7.67 per short ton. Since the average declared foreign market value of imports from Yugoslavia in 1957 was $45 a short ton, the ad valorem equivalent of the present duties is 17 percent. On the basis of the delivered cost in U.S. markets, of course, this percentage would be considerably lower.

MANGANESE

In 1957, shipments of manganese ore from domestic mines attained an alltime record of 366,000 short tons and domestic consumption rose to 2.36 million tons, also a new record. General imports in that year, totaling 3.1 million tons, were derived from 27 different countries. However, Brazil, India, Ghana (formerly the Gold Coast), Union of South Africa, and Mexico, in that order, supplied three-fourths of the total. Brazil, which alone supplied 30 percent of the 1957 imports, surpassed India which had been the principal source since 1948. All but a small fraction of the Brazilian production comes from operations financed in whole or in part by U.S. capital and a large part of the high-grade ore from the newly opened Amapa deposits is purchased by the U.S. Government. The mining company (ICOMI-Bethlehem) is reported to be exercising its option to deliver about 200,000 long tons to the U.S. national stockpile during 1959 at the exceptionally low price of 76 cents, including quality bonus per long ton unit, c.i.f. eastern U.S. seaboard. Barter transactions have also been a considerable factor in expanding imports during the last 2 or 3 years.

Stockpile objectives for all varieties of manganese ore, except chemical ore B, have been substantially equaled or exceeded. Industrial stocks are likewise at an alltime high and trade journal quotations, which are ex-duty, have declined to 92 cents per long ton unit, c.i.f. U.S. port. The comparable price was $1.69. Imports dropped off in 1958 but stocks continued to rise.

Domestic manganese ore production since 1951 has been largely dependent upon Government purchase programs. Nevada's leading position among the manganese-ore-producing States is the result of

a contract with Manganese, Inc., which produces metallurgical nodules from flotation concentrates. Arizona, where as many as 40 mines have contributed to the "carlot" program, rose to second place in 1957, supplanting Montana which for many years had been the largest producer. These three States accounted for 75 percent of the total output in the 1957 period.

Termination of the low-grade purchase program was a serious blow to the domestic industry in each of the three locations where depots were established—Arizona, Montana, and New Mexico. Similar programs were requested by miners in Arkansas and in the Southeastern States but were not established by the Government.

It is now anticipated that the "carlot" program will be filled before the end of 1959 instead of continuing to the end of the established time limit in 1961. It would have ended even earlier if production had not fallen off due in some cases to abandonment of new capital expenditures which would not be amortized in the foreseeable life of the program. Moreover, since this program is aimed at small producers, the 10,000-ton limitation of annual purchases from any single producer has restricted the investment of substantial capital in managanese mining ventures.

MERCURY

In 1958 the output of mercury at domestic mines rose to 38,000 flasks, 10 percent above the 1957 output and the highest figure for a peacetime year since 1883.

General imports were only 30,935 flasks in 1958 and 45,449 in 1957, but 53 percent of the 1958 imports arrived in the last quarter of the year.

In the first quarter of 1959, imports declined but they still exceeded the average for the preceding 2 years. Domestic production in this period was less than in any country since the corresponding period in 1957, industrial consumption declined, producers' stocks increased slightly, and prices were sharply reduced, averaging $220.21 for the quarter or $8.85 less than for the preceding quarter. Consumers' and dealers' inventories, on the other hand, were the lowest since 1955.

California supplied 59 percent of the total production in the 1959 first quarter, followed in the more or less usual order by Nevada 18 percent, Alaska 12 percent, Idaho 8 percent Oregon 3 percent, and Arizona less than 1 percent. Of the 13 important mines, 8 were in California, 2 in Idaho, and 1 each in Alaska, Nevada, and Oregon. In 1958 the total number of producing mines dropped to 101 from 120 in the preceding year; however, 97 percent of the 1958 output came from only 22 mines.

The GSA guaranteed-price purchase program for mercury, which was scheduled to expire in 1957, was extended another 12 months to December 31, 1958. Of the total of 26,891 flasks of domestic and 3,274 flasks of Mexican metal purchased under this program, 17,463 domestic and 2,508 Mexican were acquired in 1958 under the extended program. The ODM expansion goal for mercury was closed in 1957 and inventories under the Stockpiling Act substantially equal or exceed present procurement priority levels, minimum objectives, and long-term objectives.

Government grants for exploration of eligible mercury deposits through the Office of Minerals Exploration (formerly DMEA) were reduced in 1957 from 75 percent to 50 percent of the approved costs.

The 1930 tariff rate of $19 a flask (25 cents a pound) on mercury, presently unchanged, is equivalent to about 10 percent of the U.S. price. In recent years, trade journal quotations have ranged from a low of $183–$185 a flask in November 1953, to a high of $323–$325 a flask in March 1955.

World production of mercury has increased steadily for about 10 years. In 1958 it totaled 248,000 flasks, the highest since 1942.

For many years the Spanish-Italian cartel, Mercureo-Europeo, was the dominant factor in world supply. This cartel was formed in 1928 when world stocks were excessive, but it soon succeeded in boosting prices. In 1931 prices had risen to a point where the U.S. mining industry, which virtually collapsed after World War I, could be revitalized. After supplying its own requirements and a small export trade for several years, the United States again became a net importer and has continued to be dependent more or less upon foreign metal except briefly during World War II. Originally, the cartel controlled 80 percent of world output, sales being allocated 55 percent to Spain and 45 percent to Italy, but it was disbanded on January 1, 1950, after the United States made a large purchase of Italian mercury with counterpart funds.

Italy has recently become the world's largest producer with Spain in second place. Together, they furnished only 46 percent of the total output in 1958, the United States ranking third, followed by Mexico, Yugoslavia, and Japan, in the order named. Smaller amounts of mercury are supplied by several other countries.

In the 1930's it was commonly supposed that reserves of mercury in domestic deposits were virtually exhausted but as a result of new discoveries and higher prices they are currently estimated as being sufficient to maintain production at recent annual rates for at least two or three decades. Spain is generally credited with having the largest reserves of high grade ores, but indicated and inferred reserves in several other countries are also large. Most mercury deposits in the United States are rather small and highly irregular and consequently tend to be costly to mine. It has been estimated that few of them could be worked profitably under present-day conditions at prices below about $200 a flask.

MICA

The United States has been almost completely dependent on foreign sources for high quality sheet mica. India and, to an increasing extent, Brazil are principal sources of strategic quantities of mica by reason of their generally larger and richer deposits and relatively low labor costs. The mining and preparation of high quality muscovite block mica calls for an extraordinary amount of hand labor. Women, children, and old men do most of the work of preparing mica for market in India and even in Brazil. Living standards and wages in the mica mining areas are far below North American levels. A little progress has been made in the manufacturing of synthetic mica, but no suitable substitutes have yet been found for major electronic uses which are expanding rapidly and which are of vital military importance.

Domestic production of nonstrategic sheet mica and even of ground mica falls short of U.S. requirements but these segments of the mica industry are of a somewhat stronger competitive position and have low priority from the standpoint of national defense.

Stockpile objectives for mica splittings (both muscovite and phlogopite) have been met and the commercial development of reconstituted mica sheet has reduced our dependence upon these products of natural mica. Acquisition of the stockpile objectives of highly critical varieties of muscovite block and film, however, have progressed slowly because only meager quantities have been available over and above the free world's industrial requirements.

Under the domestic mica purchasing program, the Government has established depots in North Carolina, New Hampshire, and South Dakota. The prices paid for domestic mica at these three depots range from three to five times the prices of imported mica of equivalent grade (size) and quality. This program is scheduled to expire June 30, 1962, or when total purchases under the program are equivalent to 25,000 short tons of hand-cobbed mica, whichever comes first.

Notwithstanding heavy subsidies, the domestic mica industry has been unable to equal the annual production rate in the 1920's and 1930's for sheet mica. In 1948–52 imports in this category averaged about three times the annual rates before World War II, but since 1953 the volume has tended to decline although values have tended to rise partly because of higher unit prices and partly because of a disproportionate increase in the quantities of the more expensive grades and qualities.

Under the Tariff Act of 1930 manufactured block or sheet mica valued above 16 cents per pound was dutiable at a composite rate of 4 cents per pound plus 25 percent ad valorem. Subsequently, the ad valorem factor was eliminated so the present duty is only 4 cents per pound. Because the average value of imports under this category has risen to substantially more than $2 per pound, the present specific duty is equivalent to an ad valorem rate of 1 to 2 percent.

Government participation in approved mica exploration projects eligible for DME loans was reduced in 1957 from 75 percent to 50 percent.

MOLYBDENUM

For many years, the United States has produced 90 percent or more of the free world output of molybdenum. Most of the remainder comes from Chile but there is a small and growing output in Canada and some production in Norway and other countries. Domestic production is predominantly from a single large molybdenum mine at Climax, Colo. (65 percent) and as a copper mine byproduct in Arizona, Nevada, New Mexico, and Utah. Molybdenum is also recovered increasingly as a coproduct with tungsten in California.

In 1958, foreign production remained at about the same level as in the previous year but the U.S. share of the world total dropped to 86 percent. Production in Chile increased sharply from 3.1 to 4.0 million pounds and U.S. output dropped from 60.7 to 40.6 million pounds.

The duty on molybdenum content of imported ores and concentrates in the Tariff Acts of 1922 and 1930 was 35 cents per pound but this was reduced under GATT to 30 cents, equivalent to about 32 percent of the U.S. price. Since 1953, the price of molybdenite concentrates

has tended to move gradually upward from about $1 per pound of contained molybdenum, f.o.b. Climax, Colo. On November 1, 1958, it was raised from $1.18 to $1.25.

Stockpiling objectives for molybdenum have been filled. After granting accelerated tax amortization certificates totaling $2.9 million, the expansion program for molybdenum was closed on August 1, 1955.

NICKEL

Until recently the United States produced less than 1 percent of its requirements of nickel. Even today, the only substantial domestic nickel mining enterprise is the Hanna operation near Riddle, Oreg. In 1947, this operation yielded 20,564 tons of ferronickel, averaging 44 percent nickel. A little nickel is recovered from the treatment of complex ores in Missouri and a few hundred tons a year are recovered by American copper refineries, but U.S. industrial requirements, which have generally exceeded 100,000 short tons a year since 1950, are largely imported.

Imports in recent years have been further augmented by heavy Government purchases for the national stockpile, but inventories acquired under the Stockpiling Act now equal or exceed the present procurement priority level. Total imports in 1953–57 were obtained from Canada, 79 percent; Cuba, 12 percent; Norway, 8 percent; other sources, 1 percent.

Nickel is one of the first metals placed on a restricted-use basis during World War II and even more severe restrictions were needed to check the upsurge in the use of nickel during the Korean emergency. Although domestic shortages held back the development of new uses and stimulated substitution, nickel did not become plentiful again until 1958. Meanwhile, free world production capacity increased to about 256,000 tons a year, almost double that existing before the Korean conflict, and is scheduled to rise to 325,000 tons in 1961. In 1957 the free world consumption was about 208,000 tons and in 1958 it dropped to around 165,000 tons. The principal cause of this decrease was the business recession in the United States and Canada, but the long-continued shortage of nickel production capacity appears now to have been replaced by a possible surplus. U.S. Government-purchase contracts, advance loans, and other financial aids were major factors in speeding up the expansion in the production capacity in Canada as well as in Cuba where the U.S. Government-owned plant at Nicaro, which was rehabilitated in 1952, completed a 75 percent expansion program in 1957.

The tariff duty on nickel at present is 1.25 cents per pound. The New York price has remained at 75 cents a pound following an increase in 1956 from 65.5 cents.

PLATINUM GROUP METALS

Domestic production of platinum and other metals of this group has recently ranged from 14,500 to 35,000 troy ounces a year. About 75 percent of this small present-day output comes from a single placer mine in the Goodnews Bay district of southwestern Alaska; the remainder is a byproduct recovered in the refining of gold and copper derived from domestic ores. Additional quantities of platinum group

metals are recovered at U.S. refineries treating material derived from foreign ores and there is also some production of secondary metals in this country, but by far the bulk of domestic requirements must be imported in the form of refined metals.

U.S. imports (duty free) averaged 394,561 ounces annual in 1948–52, rose to more than 1 million ounces a year in 1955–56, and declined to 687,000 and 652,100 ounces, respectively, in 1957–58. Canada and Europe (includes African metals refined in England) are major suppliers of refined metals. Imports of unrefined material come principally from Colombia.

Inventories of platinum and iridium in the stockpile substantially equal or exceed present procurement priority levels, minimum objectives, and long-term objectives and those of palladium ore are sufficient to make additional market purchases unnecessary. Several of the platinum group metals, however, are still eligible for barter transactions.

SULFUR

Production of sulfur in the United States declined in 1958 to 6,260,000 long tons from 7 million in 1957. Nearly 75 percent of the total was Frasch (hot water mined) sulfur from Texas and Louisiana. The remainder comprised 630,000 tons of byproduct sulfur from petroleum refining (sour oils and gases), 400,000 tons from pyrite, and 520,000 tons from other sources.

The United States is the world's largest exporter of sulfur, and exports have been well maintained around 1.6 million annually for several years. Imports, formerly insignificant, began to be important in 1955. Mexican production of Frasch sulfur expanded rapidly to about 1,250,000 tons in 1958 and Canadian production of petroleum byproduct sulfur has risen to perhaps 160,000 tons a year. Competition from these new sources has developed in domestic as well as foreign markets for U.S. sulfur. Recovery of byproduct sulfur is expanding rapidly in several oversea countries.

Imports of sulfur into the United States are duty free.

Prices of domestic mine sulfur were frozen during the Korean conflict within the range of $21 to $27 per long ton, f.o.b. mine, although sales abroad were reported up to $200 or more per long ton. After controls were abolished in March 1953, prices of U.S. Frasch sulfur rose slightly but after averaging $26.50 for several years, dropped in 1957 to $23.50 per long ton, f.o.b. mines. This quotation is for "bright" sulfur; "dark" sulfur is quoted at $1 per ton less.

Inasmuch as producers' stocks at Frasch mines are generally large, sulfur is not included in the national stockpile. Somewhat unexpectedly, a shortage developed in 1950, after the invasion of South Korea, and sulfur was put under Control Order M–99 by the National Production Authority on June 2, 1951. To assist and encourage expansion of the industry during this period, the Government allowed rapid tax amortization, purchase contracts, and other incentives, but special Government-support programs are not a significant factor in the sulfur industry at present.

TIN

The domestic tin mining industry is now inactive. In the past, sporadic operations have been reported in Alaska, California, Colorado, New Mexico, North Carolina, and North Dakota. Known

reserves in these States comprise relatively low-grade material that cannot be mined economically at prices prevailing in recent years.

The U.S. Government smelter in Texas was sold to a private company in 1957 and has since been operated on only a small scale. During World War II, however, it produced as much as 43,468 long tons of tin in a single year from concentrates imported largely from Bolivia, plus more or less from Indonesia, Thailand, and the Belgian Congo.

The tin requirements of the United States exceed those of any other country. Since 1950, its consumption of primary tin has fluctuated between 45,323 long tons in 1952 and 60,470 tons in 1956. Import sources (1953–57) have been Malaya, 64 percent; Netherlands, 15 percent; Belgian Congo, 11 percent; United Kingdom, 9 percent; others 1 percent. Consumption of secondary tin, domestically produced, ranges from 24,000 to 33,095 long tons a year.

Early in 1951, primary tin sold in New York for over $1.80 a pound, but the annual average price since 1952 has hovered around 95 cents. The current quotation (June 1959) is nominally $1.0475.

The predominant factor in the world tin situation is the International Tin Agreement which undertakes to regulate supply and demand and to maintain prices with rather narrow limits. Buffer stocks of tin are accumulated or released and support controls have been established to regulate production in accordance with quantities allocated to member countries.

The U.S. Government minimum and long-term stockpile objectives have been completed. Tin smelting under Government sponsorship was terminated by the sale of the Long Horn Texas smelter. In October 1957, the Alaskan property of the U.S. Tin Corp. was offered for sale to satisfy a judgment in favor of the United States of America. When no acceptable bid was submitted, the Government took possession of the property.

Government participation in OME (formerly DMEA) contracts was reduced from 90 percent to 50 percent in October 1957.

TUNGSTEN

Only two domestic mines are known to be producing tungsten ore at present and in both of these the tungsten is a byproduct. Purchases authorized under Public Law 733, 84th Congress, were suspended in December 1956 for lack of funds and the authority expired December 31, 1958.

Stimulated by historically high prices, production from U.S. mines increased each year from 2,896,000 pounds of contained tungsten in 1949 to a peak of 15,833,000 pounds in 1955 and dropped only slightly in 1956. The estimated total world production during this same period increased from 31,445,000 pounds to 77,520,000 pounds in 1955 and nearly as much in 1956. This large increase, both domestic and foreign, went mostly to U.S. Government stockpiles and was paid for at above market prices. Domestic consumption, which averaged 8,090,000 pounds a year in 1948–52, dropped to 4,037,000 in 1954, advanced to 9,061,000 in 1956, and dropped to around 5,200,000 pounds in 1958.

In 1956 tungsten was mined in 12 States and Alaska, but 94 percent of the total output came from Nevada, California, North Carolina,

Montana, and Colorado, in that order. Nevada alone furnished over 35 percent and California furnished almost 28 percent. Imports in that year were derived from 23 countries. South American countries—Bolivia, Argentina, Brazil, Peru, and Chili—furnished 45 percent of the total. Next to Bolivia, Korea was the largest single source. Australia, Canada, Portugal, Mexico, and Belgian Congo were the only additional countries shipping more than 1 million pounds of tungsten to the United States in 1956.

In 1952, the average price (per STU/WO_3, c.i.f. U.S. ports, duty paid) was $63.10, only slightly below the ceiling price of $65 which was in effect through April of that year. In 1955–56 this average had fallen to $40–$40.50 and in 1958 it was estimated at only $17.15. Throughout the period of the Government domestic purchase program under Public Law 733, 84th Congress, payment was at $55 per unit.

Effective December 11, 1950, the tariff duty on imported ores and concentrates was restored 50 cents per pound of contained tungsten or approximately $7.93 per STU/$WO_3$. A short ton unit of WO_3 contains 15.86 pounds of tungsten.

Since Government purchases accounted for by far the bulk of domestic production for many years, it has been demonstrated that the $55 price actively stimulated exploration and development of domestic mines to the point where they were producing more tungsten than our peacetime industrial economy requires. Already measured, indicated, and inferred reserves in this country are more than ample to permit maintaining our self-sufficiency for at least 10 or 15 years without additional exploration.

It has also been demonstrated by the virtual collapse of the domestic mining industry in 1958 that known domestic deposits are incapable of being mined economically for tungsten as the main product unless prices substantially exceed the present level of below $20 per short ton unit, duty paid. Some mines can probably operate at a $25 price, but $35 is probably a more realistic minimum figure for maintaining a suitable domestic production base. The Tariff Commission report shows $45 (I believe).

URANIUM

The uranium mining industry is virtually a creation of the U.S. Government purchase program described in AEC Circulars 2, 5, and 6. Stockpiling is under AEC auspices but the OME program may provide loans at 50 percent of approved exploration costs on eligible properties.

Uranium ore production in the United States totaled about 5.2 million dry short tons in 1958 as compared with 3.7 million in 1957. Concentrate production at the year end was at an annual rate of 15,000 tons of U_3O_8 and in 1959 the output is expected to rise to 18,000 tons having a value of more than $300 million.

On April 2, 1958, the AEC modified its previous announcement that it would suspend contracting for delivery prior to 1962 of concentrates which would involve additional milling capacity. The new policy provided an ore market in certain areas where no market or inadequate markets previously existed. Current policies indicate maintaining the 1959 level of production through 1966. Many producers have a guaranteed market through that year and others are assured of disposing of their ores to AEC at least through 1963. An AEC announcement, dated May 8, 1958, authorized private sales of uranium materials

to licensed domestic or authorized foreign buyers. Such additional sales to purchasers other than the AEC may result in some expansion of the domestic output above the 1959 level.

The five leading producing States—New Mexico, Utah, Colorado, Wyoming, and Arizona, in the order named—mined 95 percent of the domestic ore produced in 1958. The remaining 5 percent was divided among the Rocky Mountain and Pacific Coast States. New Mexico and Utah each produced about 25 percent of the total.

Canada is the predominant foreign producer, its U_3O_8 output being only slightly less than that of the United States. Union of South Africa is the next ranking source, producing about one-half as much as the United States. France, Madagascar, Australia, Belgian Congo, and four or five other countries are smaller sources.

VANADIUM

At present the production of vanadium in the United States is a byproduct of uranium ores. Although formerly a net importer, this country has become a large exporter of vanadium. Domestic production from uranium mills and from certain other byproduct sources could be expanded severalfold, provided the increased output could be marketed at prices little if any higher than those which have prevailed over the last several years.

APPENDIX B

REPORT OF THE SPECIAL SUBCOMMITTEE ON CONDITIONS IN LEAD-ZINC MINING DISTRICTS IN KANSAS, MISSOURI, AND OKLAHOMA

(Submitted on April 10, 1959)

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
HOUSE OF REPRESENTATIVES,
Washington, D.C.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: The special subcommittee of the Committee on Interior and Insular Affairs which you recently named to visit the tristate lead and zinc mining district completed its assignment on April 6. Accompanied by Congressmen Charles H. Brown of Missouri and Denver D. Hargis of Kansas, we inspected mines and mills of the tristate district on April 3, visiting facilities in the vicinity of Joplin, Mo., Baxter Springs, Kans., and Picher, Okla. On April 4, we met with approximately 200 representatives of the mining industry and affected communities of the three States at Miami, Okla. On April 6, Congressman Randall of the subcommittee inspected the lead-mining facilities of the Flat River district in southeastern Missouri.

The tristate district, once the Nation's leading lead and zinc producing area, is now completely shut down. In a district which formerly employed thousands in its mines and in its mills, fewer than 100 men are employed today in maintenance, pumping, and fighting

deterioration of the valuable mine properties. In the little mining town of Picher, Okla., more than 700 families are subsisting on surplus commodity foods, and Picher conditions are duplicated in a number of other communities in the area.

In the Flat River district, more than 600 miners are unemployed and the remainder are working on a 4-day week.

Unemployment compensation benefits in the tristate district have been exhausted, and miners—most of them 45 years of age or older—are unable to find other employment.

Experts appearing before our subcommittee informed us that known reserves of lead and zinc in the tristate district approach 30 million tons of lead and zinc ore, and the Flat River lead reserves are regarded as among the richest in the country.

Witnesses in both of these districts were agreed on this point: Import limitations on foreign lead and zinc imposed last September have not been effective in reopening shutdown American mines or in reducing the inventories of lead and zinc in this country. Generally speaking, conditions are just as bad as they were last September, and no relief appears in sight under present quotas. Witnesses were in general agreement that the import quotas imposed last September were a step in the right direction, but far too small a step for significant effect upon the domestic mining industry.

It is therefore the consensus of this subcommittee that immediate steps should be taken to review the present governmental policy regarding assistance to our domestic lead and zinc mining industry. We believe the import levels which were established last September are in need of immediate revision, and recommend that officials of Government responsible for establishment of those import levels should be called before the committee.

Until more substantial action is taken to assist this essential industry, this Nation will continue to suffer grave economic loss in the mining areas, while the human tragedy of unemployment and actual hunger in American homes continues.

Respectfully submitted.

Hon. Ed Edmondson, *Chairman.*
Hon. William J. Randall.
Hon. J. Edgar Chenoweth.

APPENDIX C

A JOINT RESOLUTION OF THE LEGISLATURE OF THE STATE OF NEVADA; TO THE COMMITTEE ON FINANCE

ASSEMBLY JOINT RESOLUTION 13

Resolution memorializing the Congress of the United States to aid the mining industry in Nevada and other sections of the United States either by imposing tariffs or by other reasonable and effective methods so that the United States may become more prosperous and be assured of a constant supply of minerals necessary for an effective defense program.

Whereas the mining industry in Nevada and other sections of the United States has been seriously curtailed by the importation of minerals from foreign countries in which the costs of production are much lower than those which prevail in the United States under American standards; and

Whereas many areas of the United States are dependent in large measure upon the production of metals for the maintenance of their economics, and the drastic curtailment of such production has seriously affected the welfare of such areas through losses of revenue to local merchants, employees, business enterprises, and State and local governments; and

Whereas a healthy, stable domestic mining industry is a key to national security because without such industry the United States cannot be assured of a constant supply of minerals necessary for an effective defense program: Now, therefore, be it

Resolved by the Assembly and Senate of the State of Nevada (jointly), That the Congress of the United States be memorialized to aid the mining industry of Nevada and other sections of the United States either by imposing tariffs or by other reasonable and effective methods so that the United States may become more prosperous and be assured of a constant supply of minerals necessary for an effective defense program; and be it further

Resolved, That a certified copy of this resolution be prepared and transmitted forthwith by the legislative counsel to the Vice President of the United States, Speaker of the House of Representatives, and each Member of Nevada's congressional delegation.

Adopted by the senate March 10, 1959.

REX BELL,
President of the Senate.

LEALA H. WOHLFEIL,
Secretary of the Senate.

Adopted by the Assembly February 26, 1959.

CHESTER S. CHRISTENSEN,
Speaker of the Assembly.

NATHAN HURST,
Chief Clerk of the Assembly.

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